UCRL-JC-124465 Abs Rev 1

Multi-dimensional Evolution of Stimulated Scattering and Filamentation*

R. L. Berger, C. H. Still, D. E. Hinkel, A. B. Langdon, D. H. Munro, E.A. Williams, R. K. Kirkwood, B. J. MacGowan, D. S. Montgomery#, and J. D. Moody
Lawrence Livermore National Laboratory, University of California
Livermore, CA 94550

We have constructed a three-dimensional code (F3D) to study the interaction of stimulated back scattering and filamentation instabilities driven by laser beams that have large but statistically well-understood nonuniformity, e.g. at the focal plane of a laser with random phase plates (RPP). In support of gasbag experiments at LLNL with the Nova laser (and reported at this conference) in which the electron density is .05-.15 n_c critical (n_c~$9x10^{21}$ cm^{-3}), the electron temperature is T_e ~ 2-4 keV, and nearly constant over 1-2mm, we have studied the nonlinear behavior of this competition and collaboration between instabilities as a function of laser intensity, laser f-number, ion acoustic damping rate, and electron density. The effects of laser beam smoothing produced with SSD are also examined. Simulations in plasmas with strong flow and density gradients that limit SBS and SRS growth but not filamentation will be compared to the uniform plasma simulations.

---

* This work was performed under the auspices of the United States Department of Energy by the Lawrence Livermore National Laboratory under Contract No. W-7405-ENG-48.

Los Alamos National Laboratory